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BULLETIN  
OF THE  
TORREY BOTANICAL CLUB

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JULY, 1920

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Illustrations of six species of *Riccia*, with the original descriptions

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(WITH PLATES 10-13)

A systematic account of the North American Ricciaceae will soon be published by Dr. Marshall A. Howe in the North American Flora. Among the species of *Riccia* attributed in this work to the United States the following six have not yet been adequately figured, at least from American material: *R. Donnellii*, *R. dictyospora*, *R. Beyrichiana*, *R. arvensis*, *R. hirta* and *R. Curtisii*.\* It therefore seems fitting to publish in advance illustrations of these species. The data in regard to distribution and synonymy have been taken, with Dr. Howe's permission, from his manuscript; and for the sake of completeness the original descriptions, which in some cases are difficult of access, are reproduced in full.

I. *RICCIA DONNELLII* Aust. Bull. Torrey Club 6: 157. 1877

"*Dioica maxima*; fronds solida esquamosa subglauca superne maxime reticulata subtus concolore, laciniis subsimplicibus pro more discretis planiusculis siccitate canaliculatis costatis margine spinulis (serie singula) breviusculis hyalinis valde incrassatis obtusus patentibus armatis, nervo solidissimo valde incrassato subtus in media fronde terminante apice valde incrassato obtuso subdescendente, sporangiis serie singula in media fronde versus basin sitis, sporis maximis subrotundis nigris valde opacis subtuberculatis; involucris masculinis magnis valde prominentibus

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\* As indicated later *R. Curtisii* has recently been figured by McAllister, but chiefly as to the morphology of the sporophyte; and *R. Beyrichiana* has doubtless been illustrated by European authors under the name *R. Lescuriana* and possibly under other names.

[The BULLETIN for June (47: 231-278, pl. 8, 9) was issued June 23, 1920.]

subbasilaribus.—In a garden at Jacksonville, Florida, Feb., 1877.—*J. Donnell Smith.*"

HABITAT: in gardens and waste places, usually on sand.

DISTRIBUTION: Florida and Texas.

EXSICCATAE: Underw. & Cook, Hep. Amer. 42.

2. *RICCIA DICTYOSPORA* M. A. Howe, Bull. Torrey Club 28:  
163. 1901

"Thallus simple or once dichotomous, forming irregularly gregarious patches, finally oblong or elongate-obovate, rarely sub-linear, 4–10 mm.  $\times$  1–2 mm., reticulate above, light green (when dry) with at length a narrow dark-purple border; median sulcus acute and somewhat pronounced toward the apex; ventral scales entire, purple at maturity, slightly exceeding the thin submembranous ascending thallus-margins; width of transverse sections of the thallus 1.5–3 times their height, the ventral outline rounded-convex or somewhat flattened, air-canals narrow and vertical, special cells densely filled with a yellowish granular substance ('oil-body' cells) usually abundant; primary epidermal cells oval-papilliform, soon collapsing, leaving more or less persistent cup-like vestiges: monoicous; antheridial ostioles not elevated: spores brown, rather translucent, soon exposed by the rupture of the overlying parts, 95–116  $\mu$  in maximum diameter, scarcely angled, somewhat flattened, wholly destitute of wing-margins, almost uniformly areolate over entire surface, in optical section appearing densely beset on all sides with short truncate spines or papillae; areolae of the outer face 8–12  $\mu$  in width, often less perfect in the middle of the face; areolae of the inner faces so similar to those of the outer as not to be readily distinguished at first sight, yet slightly larger and less regular, with somewhat less elevated boundaries.

"On moist granite rock near Oconee River, Athens, Georgia (alt. 183 m.), Roland M. Harper, June 26, 1900, no. 68a."

HABITAT: moist granite rocks.

DISTRIBUTION: Connecticut and Georgia.

EXSICCATAE: Harper, Georgia Plants 68a.

3. *RICCIA BEYRICHIANA* Hampe; Lehm. & Lindenb. in Lehm.  
Pugill. 7: 1. 1838

"*R. fronde carnosae oblongo-linearis bifidae, supra canaliculatae, margine adscendente integerrimae, subtus nigro-purpureascentis, apicem versus incrassatae.*"

"In America boreali inter Jefferson et Gainesville legit C. Beyrich. Specimina communicavit cl. Hampe.

"Frondes caespitosae, radiculis multis longis hyalinis terrae adhaerentes, 2-4 lineares, e basi angusta lineari sensim dilatatae, rarius simplices, plerumque ad tertiam partem et ultra bifidae; lobi paullo divergentes, obtusiusculi, nonnunquam iterum emarginato-bifidi. Tota frons est carnosae, apicem versus subtus magis tumida, supra canali medio angusto instructa, viridis, margine subadscendente, sphacelata, subtus membrana nigro-purpurascens vestita, integerrima. Sub epidermide hyalina tenera e cellulis hexaedris conflata adest stratum viride satis spissum. Contextus cellulosus internus est laxior, cellulis irregularibus.

*Obs.* Proxime accedit ad *R. hortorum* [an African species], quae distinguitur statura multo majore, fronde latiore margine undulato-crenata subtus minus tumida. *Riccia tumida* [a synonym of *R. Michellii* Raddi, a European species] differt a nostra fronde minus divisa ciliata basi planiuscula."

TYPE LOCALITY: between Jefferson and Gainesville, Georgia.

DISTRIBUTION: Massachusetts to Florida, Texas, California, and Alberta; also in Europe.

EXSICCATAE: Aust. Hep. Bor.-Am. 143 (as *R. Lescuriana*).

The original description of *Riccia Lescuriana* Aust.,\* which is now considered a synonym of *R. Beyrichiana*, is as follows:

"RICCIA LESCURIANA, Aust. MSS., 1863.

"R. fronde solida subciliata orbiculata stellatim vel subcruciatim divisa incrassata, supra punctato-reticulata glauco vel cineraceo-viridi epidermide macula purpurea supra fructum notata, subtus nuda concolore vel demum purpurascens; laciniis bilobis vel di-trichotomis obcordatis lineari-cuneatisve (2-5 lin. longis, 1-2 lin. latis) leniter concavo-canaliculatis, apice emarginatis brevi sulcatis, margine hirsuto-ciliatis incrassatis obtusis subadscendentibus ad apicem subinvolutis; ciliis creberrimis brevibus albidis obtusis in statu juniore subobsoletis; fructibus sparsis non seriatis subbasilaribus, sporis fusco-atris angularibus reticulatis: gemmis? numerosis ellipticis aterrimis in frondis facie superiori versus loborum apicem positos quam sporis triplo minoribus.—*Hep. Bor. Amer. Exsic. ined.*, N. 143.

\* Proc. Acad. Nat. Sci. Philad. 1869: 232. 1869.

"Var.  $\alpha$ , cruciata. Fronde cruciatim parce divisa, laciniis ciliisque brevissimis.

"Var.  $\beta$ , trichotoma. Fronde magis divisa, laciniis ciliisque longioribus.

"The var.  $\alpha$  occurs almost exclusively on damp ground in cultivated fields; the var.  $\beta$  on rocky soil, associated with the var. of the preceding species [*R. arvensis*, var. *hirta*, now *R. hirta*], and with *R. sorocarpa* and *R. lamellosa* [now considered distinct from the European *R. lamellosa* Raddi and known as *R. Austini* Steph.].

"*R. palmata*, Lindbg., a closely related species [now included among the synonyms of *R. Michellii* Raddi], is described as having the frond palmately lobed and the divisions broadly sulcate, with the ciliae arranged in a single series. *R. Bischoffii*, Hu[e]ben. [a European species], has the margin of the frond membranaceous, the lobes much expanded, and spores twice as large. The var.  $\alpha$  has much the appearance of *R. bifurca*, Hoffm. [a European species], as figured in Lindbg. Monogr. d. Ricc. T. XX, f. 1, but that has the margin of the frond naked."

4. RICCIA ARVENSIS Aust. Proc. Acad. Nat. Sci. Philad. 1869:  
232. 1869

"R. fronde solida subciliata incrassata orbiculari subradiatim pluries divisa subgregario-imbricata in diametro 4-8 lineari, supra papuloso-reticulata obscure viridi vel demum secus margines purpurea, subtus nuda vel obsolete squamosa valde obtuseque carinato-incrassata ob sporangia tumentia valde nodosa; lobis obtusiusculis obsolete emarginatis lineari-ellipticis vel fere lineari-bus dichotomis versus apicem incrassatum leniter dilatatis, apice in statu juniore subadscendentibus vix canaliculatis, in aetate horizontalibus subcompressis-acuminatis evidentius lateque sulcatis, margine planis acutis (in adspectu incrassatis obtusisque); ciliis albidis brevissimis omnino inconspicuis subobsoletisve; fructibus primum versus apicem loborum infra canalem aggregatis, sporis angularibus fusco-atris reticulato-muricatis.—*Hep. Bor. Amer. Exsic. ined.*, No. 141.

"On damp ground in cultivated fields . . . about Closter, New Jersey, common.

"The canal occupies about  $\frac{1}{3}$  of the upper surface of the frond, and has a plane or slightly convex bottom with abrupt sides.

That portion of the frond between the canal and the acute margin is slightly convex above *as if thickened*. The typical form appears to be near *R. paradoxa*, De Not. [now included among the synonyms of *R. Michellii* Raddi], but that is described as being a smaller species, and the spores are said to be light-red. . . . The sporangia are placed rather towards the apex of the lobes as in *R. palmata* Lindbg.; which appears to be a larger species, with the lobes of the frond concave-canaliculate above, &c., and seems to be intermediate between this and the following species [*R. Lescuriana* Aust., now *R. Beyrichiana*]."

HABITAT: in fields and wet broken ground; common.

DISTRIBUTION: New Hampshire and Ontario to Indiana and Texas.

EXSICCATAE: Aust. Hep. Bor.-Am. 141; Haynes, Am. Hep. 2, 98.

5. RICCIA HIRTA Aust.; Underw. Bot. Gaz. 19: 274. 1894

*Riccia arvensis hirta* Aust. Proc. Acad. Nat. Sci. Philad. 1869: 232. 1869.

"Var.  $\beta$ , hirta. Statura majora, fronde subtus magis purpurea et squamigerula margine evidentius ciliata, supra omnino hirta.—Hep. Bor. Amer. Exsic. ined., No. 142.—*R. hirta*, Aust. MSS. 1864.

". . . (the var.) in rocky places about Closter, New Jersey.

". . . The var. differs from *R. cilifera*, Link. [a synonym or variety of *R. Bischoffii*], in the fronds being purple and more or less scale-bearing underneath, and not membranaceous on the margin."

HABITAT: moist rocky ground.

DISTRIBUTION: Connecticut to Louisiana and Texas.

EXSICCATAE: Aust. Hep. Bor.-Am. 142 (*p.p.*, as *R. arvensis* var. *hirta*).

6. RICCIA CURTISII James (Aust. Proc. Acad. Nat. Sci. Philad. 1869: 231. 1869, as synonym.) Steph. Bull. Herb. Boiss. 6: 369. 1898

This was originally described as representing a new genus, *Cryptocarpus* (afterwards changed to *Thallocarpus* by Lindberg\*), as follows:

"CRYPTOCARPUS, (gen. nov.) Aust. MSS., 1864.

"Frons laxa spongioso-reticulata, irregulariter subpalmatim lobata, tenuis, epidermide haud distincta. Costa nulla. Radices

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\* Not. F. et Fl. Fenn. 13: 377. 1874.

intus non papilloso (ut in *Sphaerocarpo*), longissimi, intertexti. Fructus in frondis substantia immersus (ut in *Riccia*). Sporangia depresso-globosa, singulatim nata, non libera. Calyptra stylo nigro persistente coronata. Sporae 4-jugae (ut in *Sphaerocarpo*), vix solutae, in aspectu singulae et profunde quadrilobae.

"A genus intermediate between *Riccia* and *Sphaerocarpus*, having the characters of vegetation and spores of the latter, while the fruit is immersed in the frond as in the former genus. Represented by a single species, which occurs both in the Southern States and in France.

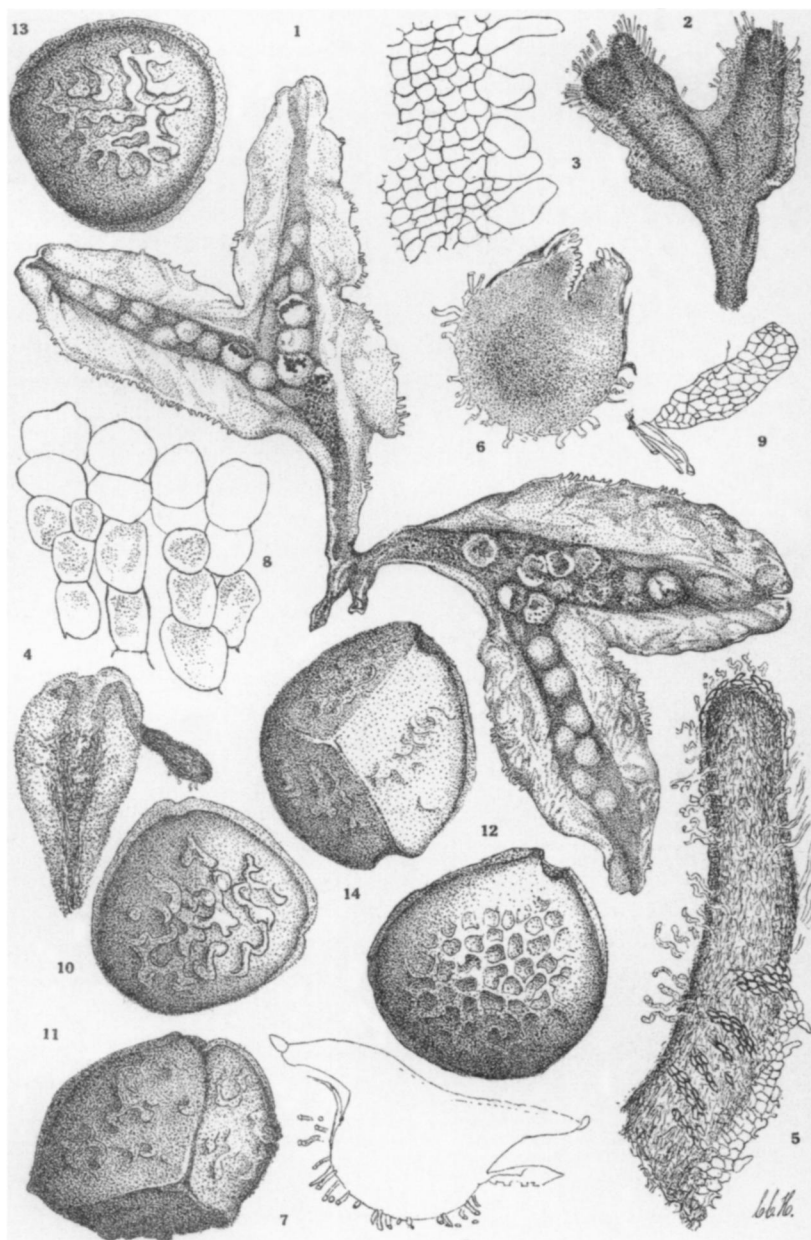
"CRYPTOCARPUS CURTISII, Aust. MSS., 1864.

"*Riccia Curtissi*, James, in Herb. (fide Curtis).

"Fronde caespitosa valde imbricata fibroso-papulata, laciniis inciso-lobulatis margine crenatis; sporangiis maximis in statu siccati latentibus sed frondes humefactae sunt in substantia earum ut maculis nigris apparentibus; sporis fusco-nigris valde muricatis.

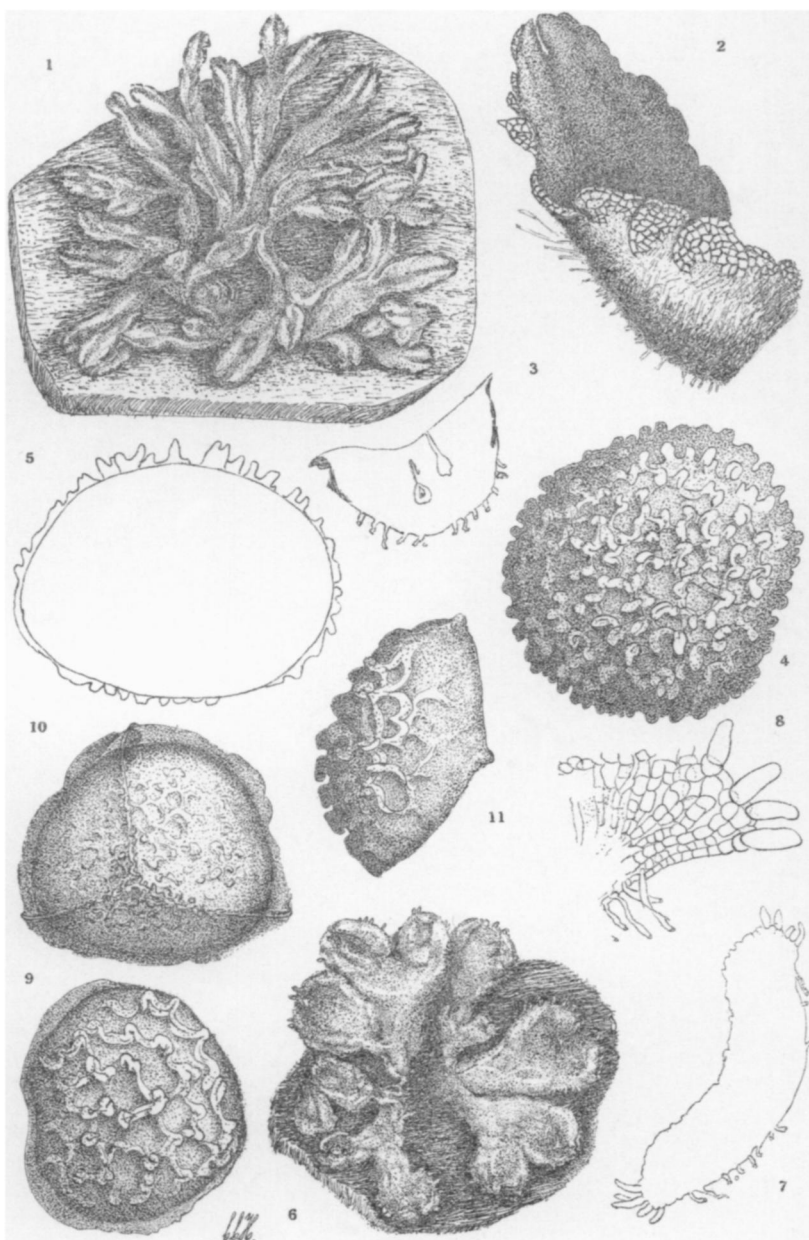
"On moist ground, South Carolina, Ravenel (in Herb. Sulliv., 1849) North Carolina, Curtis (l.c., 1853). 'Montand après Marseille' (Herb. Lanning, 'ex. Herb. Torrey').

"To the naked eye the dried specimens look like little heaps of some filamentose conferva. In this state the frond is very brittle, and, on account of its loose texture, appears to be deeply pitted and fibrose and papulose above. Upon moistening the specimens the fronds become tough (much as in the *Anthoceroeteae*), the upper surface loses its pitted appearance, and the interstices (apparent fibres) between the large cells close up; and the fruit, which was completely hidden before, now appears as a black spot in the substance of the frond. Upon re-drying the specimens the fronds become much thinner than they were at first, and the fruit remains visible, protruding from the upper surface. The frond is larger than in *Sphaerocarpus Michellii*, from the Southern States, but lobed and reticulated in the same manner. The extreme apices of the lobes are often suddenly contracted and subsolid (much as is often seen in the *Anthoceroeteae*). The base of the divisions are contracted and subsolid, and the rootlets are smooth on the interior surface as in *Sphaerocarpus*. The divisions are flabelliform, and palmately or incised-lobed, and lie

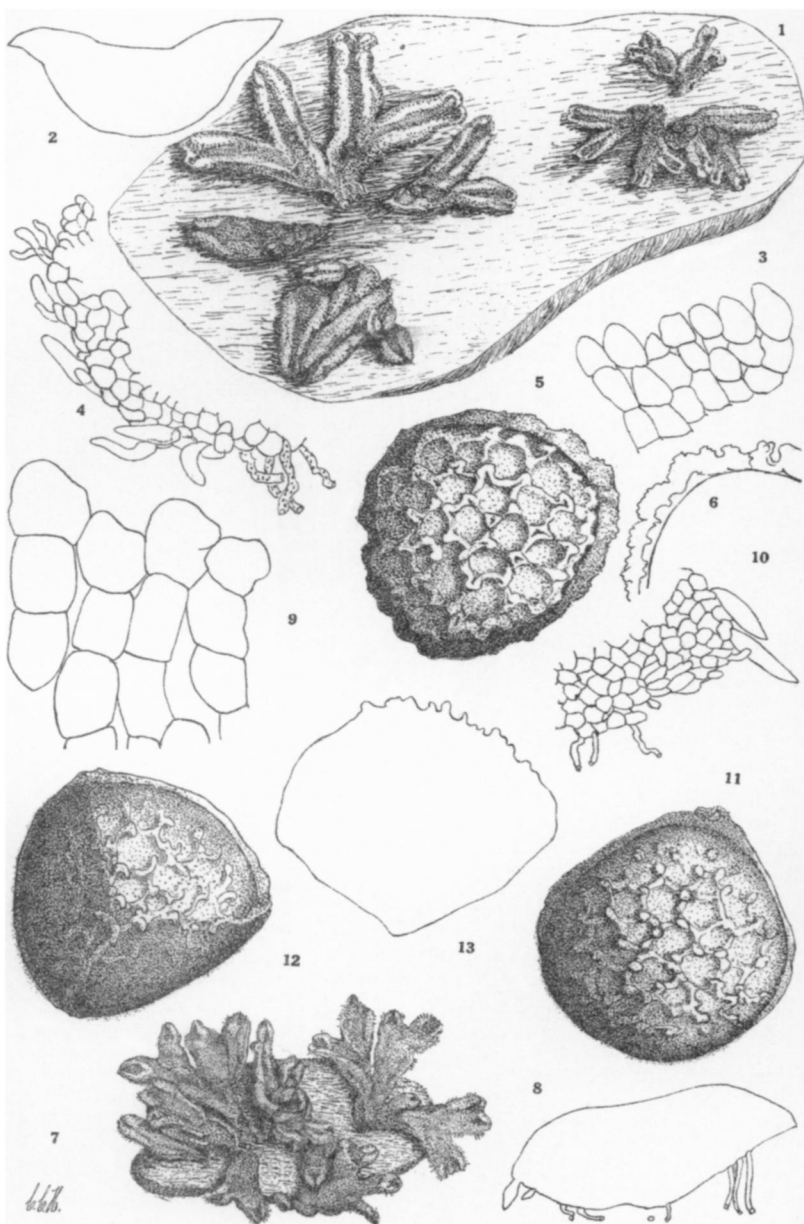


RICCIA DONNELLII AUST.

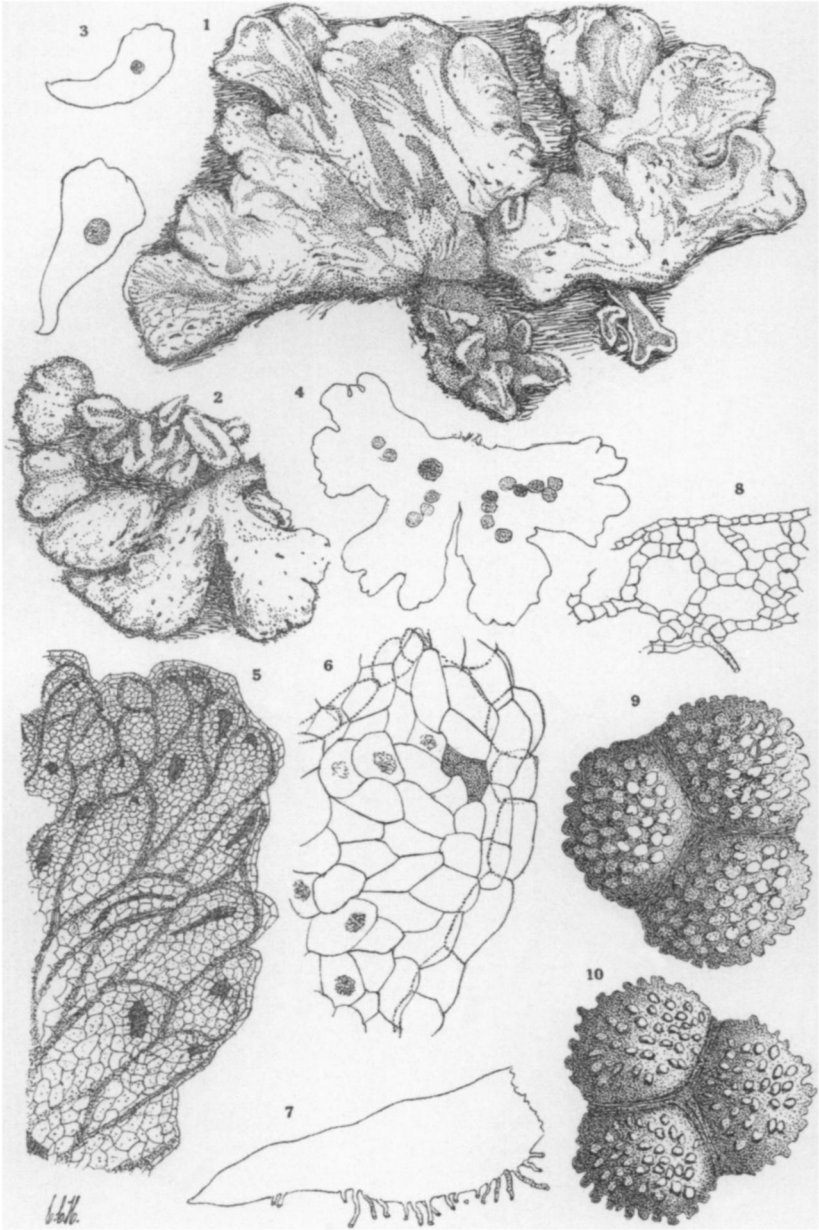




1-5. *RICCIA DICTYOSPORA* M. A. HOWE  
6-11. *RICCIA BEYRICHIANA* HAMPE



1-6. *RICCIA ARVENSIS* AUST.  
7-13 *RICCIA HIRTA* AUST.



RICCIA CURTISII JAMES

so closely over one another as to be separated with difficulty, the upper ones, by their numerous long rootlets, knitting firmly to the pitted surface of those immediately beneath them. The lobes are crenate and obtuse, not emarginate, extremely thin and hyaline. Spores firmly united in fours into a sort of *coccus* which is deeply 4-lobed, and very beautiful under the lens,—more deeply lobed than in *Sphaerocarpus terrestris* and more finely reticulated and papillose.”

TYPE LOCALITY: North Carolina.

DISTRIBUTION: North Carolina to Florida and Texas.

ILLUSTRATIONS: Bull. Torrey Club **43**: pl. 4. 1916.\*

EXSICCATAE: Underw. & Cook, Hep. Am. **43** (as *Thallocarpus Curtisii*).

Appreciative thanks are due to Dr. Howe and Professor Evans for valued assistance, to the Rev. E. E. Brooks for a translation, and to Mr. Severin Rapp for specimens of *R. Donnellii* and *R. Curtisii*, collected at different periods of the year.

HIGHLANDS,  
NEW JERSEY

#### Explanation of plates 10-13

##### PLATE 10

##### RICCIA DONNELLII Aust.

FIG. 1. Dorsal side of an unusually large mature plant, showing several capsules; in older parts, walls rupturing and spores scattering; hyaline marginal papillae plainly visible. Drawn from dry material.  $\times 4$ .

FIG. 2. Ventral side of a thallus, showing beginnings of tuberiferous or resting stage not uncommonly met with in collections made in January and February. Drawn from fresh material.  $\times 4$ . Austin's original description mentions this tendency to thicken ventrally at the apex of the axis, which is "greatly thickened and blunted as it grows downwards." This fact has been lost sight of in more recent descriptions.

FIG. 3. Portion of epidermis, with marginal cilia.  $\times 47$ .

FIG. 4. Dorsal side of old fruiting plant, through the transparent wing of which the well-developed stalked tuber is seen arising from the ventral apex of the costa.  $\times 4$ .

FIG. 5. Unusually well-developed tuberous prolongation of the costa, showing rudimentary scales.  $\times 19$ .

FIG. 6. Cross-section near apex of a tuber.  $\times 9$ .

FIG. 7. Outline of a cross-section of thallus.  $\times 19$ .

FIG. 8. Portion of epidermal layer, in cross-section, drawn from fresh material.  $\times 120$ .

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\* See McAllister, F. The morphology of *Thallocarpus Curtisii*. Bull. Torrey Club **43**: 117-126. pl. 4. 1916.

FIG. 9. Scale.  $\times 33$ .

FIGS. 10 and 11. Spore, outer and inner faces, showing irregular and anastomosing ridges.  $\times 265$ .

FIG. 12. Spore, showing outer face with light reticulations or shallow pits in middle portion.  $\times 265$ .

FIG. 13. Spore, showing outer face with markings similar to those of 10.  $\times 265$ .

FIG. 14. Spore, showing inner triangular faces.  $\times 265$ .

FIG. 1 was drawn from a specimen in the herbarium of the New York Botanical Garden, from Jacksonville, Florida, Underwood & Cook, Hep. 42; FIGS. 2 and 3, from a specimen collected by Severin Rapp, at Sanford, Florida, February 7, 1913; FIGS. 6, 8, and 9, from a specimen collected by Severin Rapp, at Sanford, Florida, May 9, 1912; FIGS. 4, 5, 7, 10, and 11, from a specimen collected by Severin Rapp, at Sanford, Florida, January, 1904, and communicated by Herr F. Stephani; FIGS. 12, 13, and 14, from a specimen in the herbarium of the New York Botanical Garden, collected at Jacksonville, Florida.

#### PLATE II

##### FIGS. 1-5. *RICCIA DICTYOSPORA* M. A. Howe

FIG. 1. Plant colony, drawn from fresh material.  $\times 4$ .

FIG. 2. Plant twisted in growth, showing latero-ventral scales.  $\times 33$ .

FIG. 3. Outline of cross-section of thallus.  $\times 19$ .

FIG. 4. Spore, outer face.  $\times 390$ .

FIG. 5. Optical section of spore, showing difference in height of papillae, the the upper side of figure representing the outer face.  $\times 390$ .

FIGS. 1 and 3 were drawn from plants collected by C. C. Haynes, on West Rock, New Haven, Connecticut, October 12, 1911; FIGS. 2, 4, and 5, from type material, R. M. Harper 68a, Athens, Georgia, June 26, 1900.

##### FIGS. 6-11. *RICCIA BEYRICHIANA* Hampe

FIG. 6. Plant colony, drawn from fresh material.  $\times 4$ .

FIG. 7. Outline of cross-section of thallus, showing cilia.  $\times 19$ .

FIG. 8. Cells and cilia seen in cross-section of thallus.  $\times 19$ .

FIGS. 9 and 10. Spore, outer and inner faces.  $\times 390$ .

FIG. 11. Spore in profile showing bold markings on outer face.  $\times 390$ .

FIGS. 6, 7, and 8 were drawn from a specimen collected by C. C. Haynes, on West Rock, New Haven, Connecticut, October 21, 1911; FIGS. 9, 10, and 11, from a specimen collected by Annie Lorenz, at Hartford, Connecticut.

#### PLATE 12

##### FIGS. 1-6. *RICCIA ARVENSIS* Aust.

FIG. 1. Plant colonies, drawn from fresh material.  $\times 4$ .

FIG. 2. Outline of cross-section of thallus.  $\times 20$ .

FIG. 3. Portion of epidermal layer in cross-section.  $\times 155$ .

FIG. 4. Portion of epidermis, showing rarely occurring cilia.  $\times 87$ .

FIG. 5. Spore, outer face, showing areolate-alveolate markings and crenate or crenulate wing.  $\times 390$ .

FIG. 6. Portion of wing with crenulate margin seen in optical section.  $\times 390$ .

FIG. 1 was drawn from a specimen collected by C. C. Haynes, at Hartford, Connecticut, October 20, 1911; FIG. 2, from a specimen collected by Fred Donaghy,

Harrodsburg, Indiana, February 20, 1915, in the herbarium of the New York Botanical Garden; FIGS. 3 and 4, from a specimen collected by C. C. Haynes, Highlands, New Jersey, October 7, 1911; FIG. 5, from a specimen collected by A. W. Evans, Orange, Connecticut, October, 1899, Haynes, Am. Hep. 2; FIG. 6, from a specimen collected at Closter, New Jersey, by C. F. Austin, Hep. Bor.-Am. 141.

FIGS. 7-13. *RICCIA HIRTA* Aust.

- FIG. 7. Plant colony, drawn from fresh material.  $\times 4$ .  
FIG. 8. Outline of cross-section of thallus, showing two cilia.  $\times 33$ .  
FIG. 9. Portion of epidermal layer in cross-section.  $\times 265$ .  
FIG. 10. Portion of epidermis showing two cilia.  $\times 87$ .  
FIG. 11. Spore, outer face.  $\times 390$ .  
FIG. 12. Spore, inner faces.  $\times 390$ .  
FIG. 13. Outline of spore in profile showing papillae on outer face, represented by upper side of figure.  $\times 390$ .

FIG. 7 was drawn from a specimen collected by Annie Lorenz, Meriden, Connecticut, November 12, 1911; FIGS. 8, 9, 10, and 11, from a specimen collected by Annie Lorenz 956, West Hartford, Connecticut, October 8, 1911; FIGS. 12, and 13 from a specimen collected by F. V. Coville, Georgetown, District of Columbia, December 24, 1889.

## PLATE 13

*RICCIA CURTISII* James

FIGS. 1 and 2. Plant colonies, showing archegonial (larger) and antheridial (smaller) plants.  $\times 4$ .

FIGS. 3 and 4. Outlines of simple plants, showing capsules.  $\times 4$ .

FIGS. 5 and 6. Epidermal cells, dotted and heavy lines indicating lamellae, forming walls of the air-chambers.  $\times 240$ .

FIG. 7. Outline of portion of thallus in cross section.  $\times 4$ .

FIG. 8. A portion of thallus in cross section.  $\times 33$ .

FIG. 9. Spore tetrad, showing very blunt papillae and very low connecting basilar ridges.  $\times 307$ .

FIG. 10. Spore, covered with more conical papillae.  $\times 307$ .

FIGS. 1, 3, 5, and 9 were drawn from a specimen collected by Mary Young, Austin, Texas, March 3, 1914; FIGS. 2, 6, and 8, from a specimen collected by Severin Rapp, Sanford, Florida, May 2, 1912; FIGS. 4 and 10, from a specimen collected by Severin Rapp, Sanford, Florida, April 12, 1911; FIG. 7, from a specimen collected by Severin Rapp, Sanford, Florida, December 12, 1911.